REMARKS

Objections To The Drawings:

In the Office Action, the Examiner has objected to the drawings, particularly Figures 4 and 7-11B, and has required submission of new corrected drawings. Formal drawings depicting all of the figures of the application are being submitted contemporaneously herewith, and Applicant respectfully requests that the objection to the drawings be withdrawn.

Claim Rejections:

Claims 1-9 stand rejected under 35 U.S.C. §102(b) or 35 U.S.C. §103(a), and Claims 10-36 have been withdrawn from further consideration. More particularly, the Examiner contends in the Office Action that United States Patent No. 6,002,952 to Diab et al. (hereafter Diab) anticipates Claims 1, 2, 5, 8 and 9, and that Claims 3, 4, 6 and 7 are obvious in view of Diab. Applicant respectfully disagrees that Diab discloses or renders obvious the inventive combination of features included in independent Claim 1 as presently presented and therefore respectfully traverses the Examiner's rejection of independent Claim 1 and dependent Claims 2-9 based on Diab. In this regard, as summarized more fully below, Diab does not teach or render obvious to one skilled in the art Applicant's method wherein selected potions of plethysmographic signals are transformed into the frequency domain, log transformations are applied to the frequency domain signal portions, and the log transformed frequency domain signal portions are transformed into the cepstral domain.

More particularly, independent Claim 1 is directed to a method of processing at least first and second time domain plethysmographic signals obtained from a patient that includes selecting at least one desired portion of the first time domain plethysmographic signal and selecting at least one desired portion of the second time domain plethysmographic signal. The selected desired portions of the first and second time domain plethysmographic signals are transformed into first and second frequency domain plethysmographic signal portions corresponding to the selected desired portions of the first and second time domain plethysmographic signals. Log transformations are applied to the first and second frequency domain plethysmographic signal portions to obtain first and second log transformed frequency domain plethysmographic signal portions corresponding to the selected desired portions of the first and second time domain

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plethysmographic signals. The first and second log transformed frequency domain plethysmographic signal portions are transformed into first and second cepstral domain plethysmographic signal portions corresponding to the selected desired portions of the first and second time domain plethysmographic signals. At least one of the first and second cepstral domain plethysmographic signal portions are examined to obtain information therefrom relating to a physiological condition of the patient.

In contrast with Applicant's claimed method, Diab does not disclose a signal processing apparatus and method in which log transformations of plethysmographic signal portions occur between transformation of plethysmographic signal portions into the frequency domain and subsequent transformation of the plethysmographic signal portions into the cepstral domain. In this regard, Figure 17 of Diab depicts a transform based pulserate detection process in which an input time domain plethysmographic waveform f(t) is fed into a Fourier transform block 1702 which forward transforms f(t) into the frequency domain to obtain F(ω), a magnitude block 1703 finds the magnitude of F(ω), a second Fourier transform block 1704 transforms the magnitude of F(ω) into a complex signal G(x), block 1705 extracts the real portion of G(x) which is fed into 1/x mapping block 1706 the output of which is fed into a pulserate detector block 1707. (See Diab Figure 17 and Column 20, lines 35-56). Diab mentions that in an alternate embodiment, magnitude block 1703 can be replaced by a block which extracts the real portion of the waveform and that block 1705 which extracts the real portion of G(x) can be replaced by a magnitude block that extracts the magnitude of G(x). (See Diab, column 20, lines 57-61). Thus, Diab does not teach use of a log transform between the two Fourier transforms in Figure 17 or elsewhere, and does not anticipate the inventive combination of Claim 1.

In fact, in describing additional embodiments, Diab specifically states: "Furthermore, it will be understood that transformations of measured signals other than logarithmic conversion ... are possible". (See Diab column 22, line 66 through Column 23, line 3). Thus, Diab actually discourages one skilled in the art from performing post-frequency domain log transformations when processing plethysmographic signals obtained from a patient, and therefore Diab cannot be relied upon in combination with knowledge available to those skilled in the art to render obvious the inventive combination of Claim 1.

Conclusion:

In view of the foregoing, Applicant respectfully submits that the rejection of independent Claim 1 based on Diab should be withdrawn, and since independent Claim 1 is in condition for allowance, there is no need to separately address the patentability of the claims depending directly or indirectly therefrom. In this regard, Applicant believes that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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Date: _February 21, 2006_

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